



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,688	11/20/2001	Tsunenobu Hori	11-073	9032
23400	7590	01/11/2005	EXAMINER	
POSZ & BETHARDS, PLC 11250 ROGER BACON DRIVE SUITE 10 RESTON, VA 20190			PERRY, ANTHONY T	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/988,688

Applicant(s)

HORI, TSUNENOBU

Examiner

Anthony T Perry

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-13, 15, 17, 18, 20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-13, 15, 17, 18, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The Amendment filed on 10/22/2004, has been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson (US 5,430,346).

Regarding claim 1, Johnson teaches a spark plug comprising a metal shell and a center electrode within and insulated from said metal shell (see col. 4, lines 4-12). Johnson teaches that a ground electrode opposes a tip end of the center electrode defining a spark gap there between, as well as the ground electrode being connected to the metal shell through a laser fused weld (col. 4, lines 42-50).

Regarding claim 2, Johnson teaches the whole of the ground electrode being made of an alloy (col. 5, line 68 – col. 6, line 3). Johnson teaches the ground electrode being connected at an end thereof directly through a laser fused weld to the metal shell (col. 4, lines 42-50).

Regarding claim 15, Johnson teaches the tip portion (65) of the center electrode (18b) being made of a Pt alloy (see Fig. 26 and col. 5, lines 54-58).

Regarding claim 17, Johnson teaches the tip portion (65) of the center electrode (18b) being made of an Ir alloy (see Fig. 26 and col. 5, lines 54-58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 5,430,346).

Regarding claim 3, Johnson does not specifically state depth of the weld between the metal shell and the ground electrode. However, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a workable range for the welding depth so that ground electrode stays secured to metal shell throughout the use of the spark plug, since optimization of workable ranges is considered within the skill of the art.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 5,430,346) as applied to claim 1 above, and further in view of Takafumi et al. (JP 63-266046).

Regarding claims 4-5, Johnson fails to specifically teach the composition of the metal shell. However, Takafumi teaches a composition of a metal shell for a spark plug that is made of an Fe-based alloy containing 0.15% by weight or less of S, 0.35% by weight or less of Si, 0.25% by weight or less of C, 1.5% by weight or less of Mn, and 0.1% by weight or less of P (see abstract). This composition provides a metal shell with excellent tensile strength (see abstract). Accordingly one of ordinary skill in the art at the time the invention was made would have found

Art Unit: 2879

it obvious to have the metal shell with the above composition, as taught by Takafumi, so as to provide a spark plug with a metal shell having excellent tensile strength.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 5,430,346) as applied to claim 1 above, and further in view of Franks (US 3,958,144).

Regarding claim 7, Johnson fails to specifically teach the ground electrode being made of 50 wt% or more of Ir. However, the Franks reference teaches that spark plugs having a ground electrode composed of more than 60 wt% of iridium with an additive of nickel produce a sparking operation considerably improved over previous spark plugs (col. 1, lines 44-64). Accordingly one of ordinary skill in the art would have found it obvious at the time the invention was made to use the ground electrode comprising of 60wt% of iridium with an additive of nickel, in place of the ground electrode taught by Johnson, so as to provide a spark plug with an improved sparking operation.

Claims 8, 10, 13, 18, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 5,430,346) in view of in view of Franks (US 3,958,144).

Regarding claims 8 and 13, Johnson teaches a spark plug comprising a metal shell and a center electrode within and insulated from said metal shell (see col. 4, lines 4-12). Johnson teaches that a ground electrode opposes the center electrode defining a spark gap there between, as well as the ground electrode being connected directly to the metal shell through a laser fused weld (col. 4, lines 42-50). Johnson does not specifically teach the ground electrode being made of an Ir alloy containing a main component of 50wt% or more of Ir.

However, the Franks reference teaches that spark plugs having a ground electrode composed of more than 60 wt% of iridium with an additive of nickel produce a sparking

Art Unit: 2879

operation considerably improved over previous spark plugs (col. 1, lines 44-64). Accordingly one of ordinary skill in the art would have found it obvious at the time the invention was made to make ground electrode of 60 wt% of iridium with an additive of nickel in order to provide the spark plug with an improved sparking operation.

Regarding claim 10, Johnson does not specifically state depth of the weld between the metal shell and the ground electrode. However, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a workable range for the welding depth so that ground electrode stays secured to metal shell throughout the use of the spark plug, since optimization of workable ranges is considered within the skill of the art.

Reasoning for combination in the rejection of claims 8-9 and 13, above, apply.

Regarding claim 18, Johnson teaches the tip portion (65) of the center electrode (18b) being made of a Pt alloy (see Fig. 26 and col. 5, lines 54-58).

Regarding claim 20, Johnson teaches the tip portion (65) of the center electrode (18b) being made of an Ir alloy (see Fig. 26 and col. 5, lines 54-58).

Regarding claim 21, Johnson teaches the ground electrode being L-shaped (see Fig. 6).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US 5,430,346) as applied to claims 8-9 and 13 above, and further in view of Takafumi et al. (JP 63-266046).

Regarding claims 11-12, Johnson fails to specifically teach the composition of the metal shell. However, Takafumi teaches a composition of a metal shell for a spark plug that is made of an Fe-based alloy containing 0.15% by weight or less of S, 0.35% by weight or less of Si, 0.25%

Art Unit: 2879

by weight or less of C, 1.5% by weight or less of Mn, and 0.1% by weight or less of P (see abstract). This composition provides a metal shell with excellent tensile strength (see abstract). Accordingly one of ordinary skill in the art at the time the invention was made would have found it obvious to have the metal shell with the above composition, as taught by Takafumi, so as to provide a spark plug with a metal shell having excellent tensile strength.

Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfeil (US 2,406,966) in view of Johnson (US 5,430,346).

Regarding claims 1 and 6, Fig. 4 of the Pfeil reference shows a spark plug comprising a metal shell (10), a center electrode (5) retained in the metal shell and insulated from the metal shell, and a ground electrode (8) opposed to the tip end of the center electrode. The ground electrode is welded at an end thereof directly to the metal shell. Pfeil teaches that electrodes are commonly made of a platinum-iridium alloy having 80% platinum and 20% iridium (col. 1, lines 3-7) and that the electrode is connected directly to the metal shell by a welding material. Pfeil does not teach specifically teach the weld material being a laser fused weld.

However, Johnson teaches the ground electrode being directly connected to the metal shell through a laser fused welding material (col. 4, lines 42-50). It is well known in the art, that laser welding eliminates the necessity of tightly pressing the objects to be welded together, protecting them from unfavorable deformation. Also, laser welding provides a well-alloyed zone (molten zone) with minimum recrystallization forming a strong bond. Accordingly, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to use laser welding to attach the ground electrode to the metal shell of Pfeil so that the ground electrode and the metal shell are sufficiently molten due to the high density of its energy,

Art Unit: 2879

producing a spark plug with a strong bond between its ground electrode and shell while also protecting the components from unfavorable deformation.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Van Uum et al. (US 3,691,419), Kanao (US 6,307,307), and Kagawa (US 5,574,329) teach the advantages of laser welding.

Response to Arguments

Applicant's arguments filed 10/22/04 have been fully considered but they are not persuasive.

With regards to the Applicant's argument that Johnson does not teach the ground electrode being opposed to the tip end of the center electrode, the Examiner respectfully disagrees. Johnson specifically recites that the firing surfaces of the ground electrode and center electrode are opposed to one another (see for example col. 2, lines 45-48 and claim 5). Furthermore, since the ground electrode includes the supporting post, Johnson teaches that the ground electrode opposes an outer peripheral surface of the center electrode (see for example Fig. 26).

With regards to the Applicant's argument that Johnson does not teach the ground electrode being connected to the metal shell using a laser fused weld, the examiner respectfully disagrees. Johnson specifically teaches the supporting post of the ground electrode being connected to the metal shell through laser welding (see col. 4, lines 48-50).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the

Art Unit: 2879

teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation for laser welding is within the knowledge generally available to one of ordinary skill in the art as evidenced by the listed references in the "Other Prior Art Cited" section.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is **(571) 272-2459**. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

Art Unit: 2879

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-24597. **The fax phone number for this Group is (703) 872-9306.**

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [Anthony.perry@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



**JOSEPH WILLIAMS
PRIMARY EXAMINER**

for



Anthony Perry
Patent Examiner
Art Unit 2879
January 7, 2005

Vip Patel
Primary Examiner
Art Unit 2879